

component $2\omega v \sin \varphi$, where φ is defined astronomically. The component is toward the north or south according as v is positive or negative, that is as v is in the same direction as ω or not.

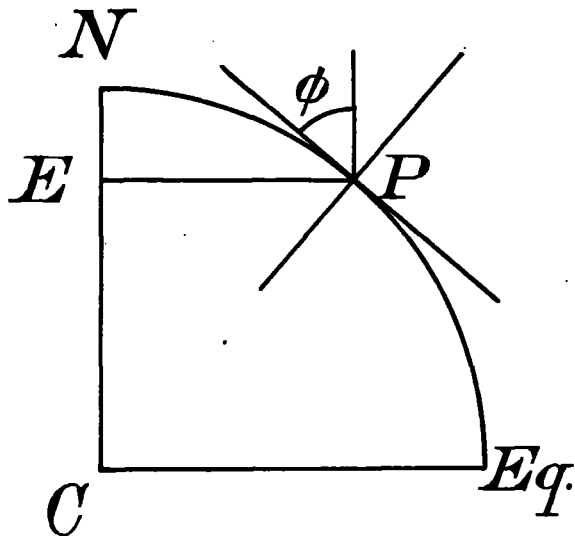


FIG. 1.

Finally, if no force acts, the air moves relatively to the circles of latitude with acceleration $2\omega v \sin \varphi$ to the south or the north according as v is from west to east or from east to west. The deflection is always to the right in the Northern Hemisphere where φ is positive.

TITLES OF PAPERS READ BEFORE THE GERMAN METEOROLOGICAL ASSOCIATION.

The Meteorological Association held its eleventh general meeting, celebrating twenty-five years of its existence, at Hamburg September 28–30, 1908. In addition to the business and social features and the visits made on the 1st of October, after the close of the session, to neighboring meteorological stations, including the kite station at Grossborstel, the readers of the MONTHLY WEATHER REVIEW will be specially interested in the scientific addresses and papers. Following is a translation of the titles.

Monday, September 28.

- Doctor Hellmann, of Berlin: On the beginnings of meteorology.
 Professor Doctor Köppen, of Hamburg: The interaction of maritime and land meteorology in their historical development.
 Vice-Director A. Steen, of Christiania: Cloudiness and daylight.
 Director Jensen, of Hamburg: The problems at present associated with the study of atmospheric polarization.
 Professor Doctor Schubert, of Eberswald: The precipitation on the Annaburger Heath.

Tuesday, September 29.

- Director Teisserenc de Bort, of Paris: The division of the atmosphere into troposphere and stratosphere, as based on the results of the exploration of the upper air.
 Director Teisserenc de Bort, of Paris, and Prof. A. L. Rotch, of Boston: On the atmospheric circulations in the intertropical and subtropical zones, from the results of three campaigns on the *Otaria*.
 Professor Doctor Hergesell, of Strassburg in Alsace: The warm high layer in the atmosphere.
 Prof. A. L. Rotch, of Boston: The warm layer of the atmosphere above 12 kilometers, in America.
 Dr. Alfred Wegener, of Berlin: Preliminary report on the kite and captive balloon ascensions of the Danish expedition to Greenland.
 Professor Doctor Erk, of Munich: Technical experiences and scientific results from the mountain station on the Zugspitze.
 Doctor Schmauss, of Munich: Simultaneous temperatures on the Zugspitze and at the same altitude in the free air.
 Doctor Coym, of Lindenberg: On absolute measurements of radiation in the free balloon.
 Professor Doctor Schreiber, of Dresden: Application of thermodynamics to the discussion of balloon observations.
 Professor Doctor Möller, of Brunswick: The air waves in the higher strata of the atmosphere depending on the diurnal heating of the whole mass of air lying below them.

Professor Doctor Börnstein, of Berlin: Report on the German Public Weather Service.

Professor Doctor Grossmann, of Hamburg: The addition of the change of atmospheric pressure or the barometric tendency to the current weather telegrams.

Doctor Polis, of Aix-la-Chapelle: The applicability of wireless telegraphy to the dissemination of weather reports.

Professor Doctor Köppen, of Hamburg: On Guilbert's rules for weather forecasting.

Wednesday, September 30.

Professor Doctor Assmann, of Lindenberg: Twenty years of work with the aspiration-psychrometer.

Professor Doctor Kassner: Exhibition of his improved Jacob's-staff, and his improved evaporimeter.

Doctor Stefan, of Hamburg: Exhibition of new meteorological apparatus and installations.

Professor Doctor Erk, of Munich: On methods of instruction in meteorology.

Professor Doctor Köppen, of Hamburg: New graphic psychrometric tables.

Doctor Less, of Berlin: Exhibition of a new daybook or journal for recording regular and also occasional weather observations.

Professor Doctor Lüdeling, of Berlin: On the measurements of atmospheric electricity on the Kara Sea by the lieutenants of the Norwegian vessel *Rachlef*.

RELATION BETWEEN THE RANGE OF AIR TEMPERATURE AND THE DISTRIBUTION OF LAND AND WATER.

By M. TSUTSUI.¹

In order to find the existence of definite relations, if any, between the range of air temperature and the distribution of land and water, we have examined the temperature observations of fourteen meteorological stations situated along the coast of the Central Honshu. At first we compared the ranges of temperature within the circles drawn with the stations as their centers and with the radius of 5 r_i (20 km.), but we failed to find any relations. Next we examined the land areas within the 2- r_i (8 km.) circle and the ranges of air temperatures observed at the centers of the circles, viz, at the meteorological stations, and found that the ranges of air temperatures are related to the amounts of land areas distributed within the circles by the following formula:

$$y = a + bx,$$

where y represents temperature range and x the area of the land distributed in the circle (the area of the circle being taken as 10), a and b are constant.

In the case in which the radius of the circle is 2 r_i ,

$$a = 4.6, b = 0.48.$$

In the case

$$x = \frac{2A + B}{3},$$

(where A = area of 2- r_i circle and B = area of 2–5- r_i circle,)

$$a = 4.55, b = 0.52.$$

For $a = 4.60$ and $b = 0.48$, the values of y differ from the observed values to the amount of ± 0.30 , the maximum difference being 0.8; and for $a = 4.55$ and $b = 0.52$, the differences of the values of y from the observed values amount to ± 0.24 , the maximum difference being 0.65.

Hence we come to the conclusion that the distribution of land and water controls the range of temperature in the area of a circle with a radius of 2 r_i , the error being less than 1° in temperature.

M. ISHIDA'S REMARKS ON M. TSUTSUI'S PAPER.

Mr. Tsutsui has shown the relation between the distribution of land and water by the linear equation

$$y = a + bx;$$

but it seems more appropriate to consider the range of temperature as a function of latitude as well as a function of the distribution of land area; hence

$$R = a + bn \cos \varphi,$$

¹ Reprinted from the English abstracts in Jour. Met'l. Soc., Japan, October, 1908, 27th year, No. 10, p. 27-8.

where R is the range of temperature, n the land area, φ the latitude, a and b the constants. I have computed the constants from the same data as used by Mr. Tsutsui, and compared the calculated values of R with those observed. I find that there exists no considerable difference between Tsutsui's and mine; but for forty stations between latitude 22° and 45° north (Tsutsui's $a=3.61$, $b=0.67$; mine, $a=4.56$, $b=0.64$, in the case $n=\frac{2A+B}{3}$) the discrepancies between the calculated and observed values are in general $\pm 0.5^\circ$ and sometimes as great as 1° , while the discrepancies between my calculated and observed values are not greater than 0.7° , the average being $\pm 0.4^\circ$.

A COMPARISON OF THE CHANGES IN THE TEMPERATURE OF THE WATERS OF THE NORTH ATLANTIC AND IN THE STRENGTH OF THE TRADE WINDS.

By Commander W. C. HEPWORTH, R. N.

Communicated by the author to the Monthly Weather Review as reprinted from the Report of the British Association for the Advancement of Science, Dublin meeting, 1908.

In order to confine that portion of the inquiry which relates to the trade winds within manageable limits, two representative areas were selected for examination. One of these lies well within the region of the northeast trade wind, and covers an area of 1,000,000 square miles; the other is in the heart of the southeast trade-wind, and covers an area of 1,380,000 square miles. For the former homogeneous averages for a period of five years only are available; but for the latter the results of four hourly observations, extending over a period of forty-five years, have been utilized for estimating normal conditions. Judged by the five years' averages, the northeast trade is strongest in April (13.5 statute miles per hour); relatively strong in February (13.0 miles); in March (12.6 miles); and in May (12.4 miles). It then rapidly declines in strength until August, when its velocity is only 8.2 miles per hour. It is lightest (7.4 miles) in September. From October its strength increases until February. According to the average results obtained for the forty-five years' period mentioned, the southeast trade is strongest, (15.5 miles per hour) in February; relatively strong (15.0 miles) in April and November; also in March and December (14.9 miles). It is at about its average strength for the year (14.7 miles) in January, August, and October. In May it is lightest (13.7 miles), and from that month gradually increases, and is again at its average strength for the year in August. It declines to 14.5 miles in September.

To represent the North Atlantic in a comparison of the changes taking place in the surface temperature of that ocean two zones were selected—the one lying between Florida Strait and Valencia, and the other between that strait and Cape Race. Average results, based on observations extending over a long series of years, show that the temperature of the surface water is lower in February, March, and April than during any other period of the year, and is lowest in March. It is relatively low, as compared with any other months than the above, in January, May, and December, and of these months January has the lowest mean surface temperature, and May the highest. The surface temperature is relatively high in June, October, and November; highest as regards those months in October, lowest in November. It is higher in July, August and September than during any other period of the year; highest of all in August, not quite so high in July as in September, in the Florida Strait to Valencia zone; but in the Florida Strait to Cape Race zone the mean is found to be the same in these two months. A comparison between results of Atlantic trade-wind velocity in each of the years 1902–1907 and those of North Atlantic surface temperatures for the same period leads to the belief that a relation may be traced between departures from the mean in the velocities of the trades in any one year and deviations from normal in the average distribution of sur-

face temperature in the North Atlantic in the year following. Further, there is some evidence to prove that departures from the average strength of the two trades during a series of months, and at times during even so short a period as one month, are roughly reflected in deviations from normal in the average distribution of surface temperature in the North Atlantic in the corresponding series of months, or month, as the case may be, of the succeeding year, notwithstanding the many causes affecting the temperature of the surface water, which must tend to mask the appearance of any such connection.

A large number of tables and diagrams accompanied this paper.

KASSNER'S METEOROLOGICAL GLOBES.

By Prof. R. DE C. WARD, Harvard University. Dated Cambridge, Mass., Sept. 28, 1908.

Professor Kassner, of the Prussian Meteorological Institute, has recently constructed two meteorological globes which can be highly recommended for use wherever meteorology and climatology are taught. The globes measure about $13\frac{1}{2}$ inches in diameter and show the pressure, temperature, and winds for January and July, on the basis of the latest and most complete data available. The globes are mounted on a wooden base, and a simple and very useful device makes it possible to turn them over, so that when desired, the south polar region is at the top. The price of the globes is 50 marks, with 3 marks additional for packing. They may be purchased of Dietrich Reimer (Ernst Vohsen), in Berlin.

Kassner's globes will unquestionably facilitate and simplify any instruction in which there is need of presenting the broad facts which they so clearly set forth. Every teacher of meteorology has had frequent occasion to regret that the great facts of temperature, pressure, and winds have to be learned from charts which, especially if they are on the Mercator projection, as is so often the case, almost always give the students a distorted or at least an unreal picture of the actual meteorological conditions, as well as of the relative sizes of the zones. A scheme of coloring is used which emphasizes the distribution of pressure and temperature, and the isobars and isotherms are drawn so that important, or critical lines are duly emphasized. The lands are shaded, and the higher elevations are shown in darker shading.

It is to be hoped that Professor Kassner's excellent work on these globes will receive proper appreciation in the United States, and that the globes will find a place in the equipment of many geographical and meteorological laboratories.

LUMINOUS FOG.

George A. Turner, second officer of the steamer *Counsellor*, reports that on Friday, July 24, 1908, when in the Gulf of Siam, latitude 30° N., longitude 103° E., "the steamer past thru a small field of remarkable phosphorescent patches in the form of a kind of vapor lying above the surface of the water in lengths of 500 to 1,000 feet and breadths of 100 feet approximately, and about 15 to 20 feet in depth to the surface of the water. At distances of 1 to 2 miles these 'streaks' appeared like shining silver (no moon shining), and at first were taken to be shoals of fish, but on passing directly thru one it had all the effect of a slight luminous fog. No disturbance or presence of any fish appeared in the water, which is only about 25 to 30 fathoms in depth, and no unusual color appeared in the contents of a draw-bucket taken at the time."

BRILLIANT GULF WATERS.

The following extract was taken from the Tampa, Fla., Times, November, 1908:

A remarkable marine phenomenon was observed by the steamship *Dover*, Capt. Von A. Carlson, as that vessel steamed to Tampa from Mobile. When at a point 35 miles from Mobile light, at 7 o'clock in the evening